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(71) Applicant (for all designated States except US): FRANKEN-GLAS B.V. [NL/NL]; Graafschap Horneelaan 196, NL-6004 HT Weert (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): GERAEDS, Johannes, Wilhelmus, Jacobus [NL/NL]; Eindstraat 25, NL-6099 BE Beegden (NL).

(74) Agent: VAN KAN, Johan, Joseph, Hubert; Algemeen Octroibureau, P.O. Box 645, NL-5600 AP Eindhoven (NL).

(54) Title: A METHOD FOR PRODUCING A LAMINATED GLASS PLATE AND OBJECTS MANUFACTURED WITH THE LAMINATED GLASS PLATE

(57) Abstract

The invention relates to a method for producing a laminated glass plate to be attached to a substrate by means of an adhesive or by mechanical means, whereby on the glass plate an adhesive film and a structure defining layer are provided in order to obtain an assembly, which by heating and pressing is formed to one unity, being a coated glass plate, that is supplied to an autoclave having a temperature of 100-135 °C and a pressure of 5-13 bar in order to obtain the laminated glass plate. The invention also relates to a door, a kitchen cabinet and building elements or wooden objects covered with a laminated glass plate produced according to the present method.

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Title: A method for producing a laminated glass plate and objects manufactured with the laminated glass plate.

5 The invention relates to a process for manufacturing a laminated glass plate. The invention also is concerning a door, building element or wooden object supplied with a laminated glass plate, produced according to the invention.

10 Such a laminated glass plate and a covered wooden substrate are known from Belgian Patent Application No. 9100272, wherein a laminated, high-gloss painted glass plate is attached to wood. Said glass plate is built up of five layers: glass, paint, a foil of plastic material, paint and glass. This type of laminated plate may be used to make a cabinet or a piece of furniture, which is as a whole painted in a high-gloss colour, whereby the main component is glass. From the said Belgian patent application it cannot be derived, however, in what manner such glass plates are to be manufactured.

15 EP-A-0 373 139 relates to laminated safety glass and to a laminate of plasticized polyvinyl butyral (PVB). Said safety glass consists of at least two glass plates with an adhesive provided therebetween, for which purpose PVB may be used, so that laminated transparent glass is obtained. Furthermore said PVB film functions as an energy-absorbing layer. The transparent polymer film may comprise one or more of the following compounds: amorphous polyamide, polyacrylate, cellulose acetate, polyvinyl chloride, polycarbonate, polysulfon, polyester or polyurethane. Only laminated safety glass is known from said European patent application.

20 From EP-A-0 565 494 a product is known produced from a glass plate on which a thin layer of an epoxy resin is applied and on the epoxy resin a pattern on which metallic parts of silver or gold have been applied with which a certain pattern aspect has been obtained. The laminated glass plate according to the invention has a simple construction and the process for the production of the laminated glass plate has been carried out in a specific way, so that the production on a large scale is possible in a well controlled way. From German patent application 35 41 12 097 a composite material is known on basis of glass and decorations on the glass. However, besides the description of the product nearly no attention has been given to the process for the production of the product.

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The thickness of the glass plate is 1 - 10 mm. The thickness of the foil is 0.38 - 1.8 mm and it may be provided in several layers on the glass plate. The thickness of the structure-defining layer is 0.3 - 5 mm.

5 In order to prevent the presence of moisture between the glass plate and the structure-defining layer a conditioning treatment is carried out before heating the glass plate and the foil and the structure-defining layer provided thereon. Said conditioning treatment preferably takes place at a temperature of 10 - 18 °C and at a relative humidity of 25 - 30%. It will be apparent, however, that these conditions are determined by the foil to be used. A higher temperature and/or a higher relative humidity will lead to an increased moisture content of the foil, as a result of which the end product, the laminated glass plate, may exhibit moisture stains, as a result of which the appearance is affected.

10 Said heating and pressing together of the glass plate and the foil and the structure-defining layer provided thereon is preferably carried out in several stages, which results in an even bonding between the glass plate and the foil and the structure-defining layer provided thereon.

15 20 The heat treatment is preferably carried out with infrared heaters, whereby the temperature is increased to 30 - 35 °C in a first stage and to 50 - 70 °C in a second stage when a PVB foil is used. If the temperature is lower than the above-mentioned ranges, the foil will be insufficiently plasticized, as a result of which an even bond between said plate and said structure-defining layer is not obtained.

25 30 The pressing together of the glass plate and the foil and the structure-defining layer provided thereon preferably takes place by means of pressure rollers, whereby the pressure may vary from 1 - 7 bar, resulting in the removal of any air bubbles present between the glass plate, the foil and the structure-defining layer.

According to the invention the coated glass plate as obtained after heating and pressing is supplied to the autoclave in order to obtain the final adhesion between the glass plate and the structure-defining layer whereby the foil is given a transparent effect.

35 The temperature in the autoclave is 100 - 135 °C and the pressure is 5 - 13 bar. If the temperature is lower than 100 °C, there will be an inadequate bond between the plate and the structure-defining layer, as a result of which the structure-defining layer may come loose.

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5 said PVB foil and said formica layer is moved, via a roller conveyor, to a second oven section comprising infrared heaters of the infrared medium wave-type. The temperature of the glass/foil/formica assembly is elevated to 55 °C in this way. The reheated glass plate obtained is then moved via a roller conveyor to a second pressing section comprising covered pressure rollers, which are set at a pressure of 5 bar. After the second pressing section the pressed-together, the covered glass plate is then removed from said roller conveyor and taken to a storage section. Then the trolley is placed in an autoclave, whereby a strong bond is formed between the formica 10 layer and the glass plate in the autoclave, whereby the PVB foil also provides a transparent effect. The temperature in the autoclave is 120 °C and the pressure is 12 bar. After a period of 3 hours in the autoclave the trolley is removed from the autoclave and the excess of PVB foil is 15 cut off from the laminated glass plate thus obtained. The laminated glass plates may then be provided on a substrate of for example wood.

A substrate of this type, on which the laminated glass plate is provided, may be used to make a building element, such as a wall, a ceiling, a floor or a façade element therefrom.

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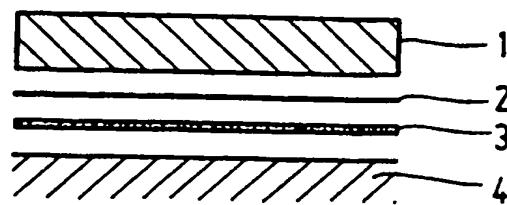


FIG. 1

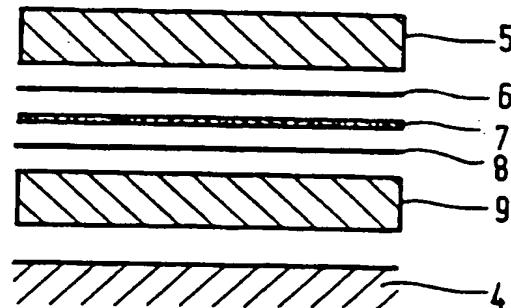


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No
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C(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 606 040 (FIGUEROLA, GILI FERNANDO CRISTALES CRUVADOS S.A.) 13 July 1994 see the whole document ---	1
A	US,A,5 098 760 (ROBERT K. FLETCHER) 24 March 1992 see claim 1 ---	5
A	EP,A,0 564 748 (CASA ADELANTADO, LUIS) 13 October 1993 see claim 1 -----	1,5,7